

CLAIMS

1. Mammography imaging apparatus, which contains either an essentially vertically standing body part or a support structure 21 attachable to a wall or a ceiling, and an arm structure in connection with it, being turnable with respect to a horizontal rotating axis 28, a radiation source 23 on one hand and image data receiving means 25 on the other hand being placed at essentially opposite ends of the arm structure, which arm structure includes at least two arm parts 22, 22' orientating essentially parallel and means for changing the mutual orientation of at least a first and a second of the said at least two arm parts, characterized in that the apparatus includes first means M for turning at least the said first arm part 22 around a horizontal axis and that to the said second arm part 22' is arranged second means M' with help of which, when turning the said first arm part 22, it is possible both to maintain the orientation of the said second arm part 22' with respect to the said first arm part 22 and to turn the said second arm part 22' in a different direction and/or at a different angular velocity with respect to the movement of the said first arm part 22.
2. Imaging apparatus according to claim 1, characterized in that the said first means contain a construction containing a first actuator M, which construction is arranged for turning the arm structure as a whole with respect to a horizontal axis.
3. Imaging apparatus according to claim 1 or 2, characterized in that the said second means contain construction containing a second actuator M' for turning at least one of the said arm parts 22, 22' with respect to at least one other arm part.
4. Imaging apparatus according to any of the claims 1 - 3, characterized in that the said first arm part 22 contains a radiation source 23 of the imaging apparatus and the said second arm part 22' contains means for receiving image data 25.
5. Imaging apparatus according to claim 3 or 4, characterized in that the said second actuator M' is arranged to the said second arm part 22'.
6. Imaging apparatus according to claim 4 or 5, characterized in that the said second arm part 22' contains a lower shelf structure 24 having at least an essentially planar upper surface, essentially in direction of its pivot axis.

7. Imaging apparatus according to claim 6, characterized in that the pivot axis of the said second arm part 22' is arranged at a small distance, like 1 – 5 cm, preferably 2 – 3 cm, from the upper surface of the lower shelf structure 24 belonging to it.

- 5 8. Imaging apparatus according to any of the claims 1 – 7, characterized in that the dimensions of the said arm structure are arranged such that when the arm parts 22, 22' are orientated essentially parallel, the distance from the focus of the radiation source 23 to the image data receiving means 25 is in the order of magnitude of 60 – 80 cm.

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9. Imaging apparatus according to any of the claims 1 – 8, characterized in that the pivot axis of the said second arm part 22' is arranged to coincide with the pivot axis of the said first arm part 22.

- 15 10. Imaging apparatus according to any of the claims 1 - 9, characterized in that the said second arm part 22' contains a compression structure 26, 27, which positions the tissue to be imaged into the imaging area.

11. Imaging apparatus according to claim 10, characterized in that the said
20 compression structure contains an upper compression plate 26 and a lower compression plate 27, which lower compression plate 27 may also consist of only the lower shelf structure 24 of the said second arm part 22', which contains the image data receiving means 25.

- 25 12. Imaging apparatus according to any of the claims 1 – 11, characterized in that the imaging apparatus includes a control arrangement via which the said actuators M, M' are arranged to be programmatically drivable.

13. Method for turning an arm structure of a mammography imaging apparatus, which
30 arm structure contains either a vertical base part or support structure attachable to a wall or a ceiling, and a structure in connection with it that is turnable with respect to a horizontal rotating axis, which structure has on one hand a radiation source and on the other hand image data receiving means located essentially at the opposite ends of it, which arm structure includes at least two arm parts orientating essentially parallel, and
35 means for changing mutual orientation of at least a first and a second of the said at least two arm parts, characterized in that while the said first arm part is rotated around a horizontal axis, the said second arm part is rotated either in the same direction at a different angular velocity, or in the opposite direction.

14. Method according to claim 13, characterized in that the said first arm part is rotated by the same actuator by which the arm structure as a whole may be rotated.

- 5 15. Method according to claim 13 or 14, characterized in that the said second arm part is rotated by an actuator integrated to the said arm part.

16. Method according to any of the claims 13 – 15, characterized in that in the method one moves from a first position of the arm structure, where the said at
10 least first and second arm parts are orientated essentially parallel with respect to each other, to another corresponding position, such as from a previous imaging position to a subsequent imaging position, according to a motion-sequence which contains such an intermediate phase where the said first and second arm parts are essentially in some other orientation than parallel, whereupon at least one of the movements of the
15 sequence contains a movement realized according to any of the claims 13 – 16.

17. Method according to claim 16, characterized in that the said sequence contains at least one phase where the said second arm part is rotated in a different direction but at the same angular velocity as the said first arm part.
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18. Control arrangement of a mammography imaging apparatus, which contains means and control routines for realizing actions according to the method of any of the claims 13 – 17.

- 25 19. Control arrangement according to claim 18, characterized in that it contains at least one control routine for driving the arm parts from a first position to a second one.

20. Control arrangement according to claim 19, characterized in that the said
30 control routine contains driving of the arm parts into at least one position where the mutual orientation of at least two arm parts has been essentially deviated from parallel orientation.

21. Control arrangement according to any of the claims 18 – 20, characterized
35 in that the said program routines include routines with help of which desired control sequences for the arm parts may be created into the control arrangement.

22. Control arrangement according to any of the claims 18 – 21, characterized in that it contains means for following and/or recognizing the mutual orientation of the arm parts, and/or their orientation with respect to support structures of the apparatus.